Amino acid

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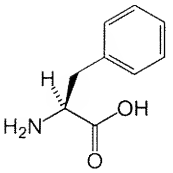
In chemistry, an **amino acid** is any molecule that contains both amine and carboxyl functional groups. In biochemistry, this term is used to refer to alpha amino acids: molecules where the amino and carboxylate groups are attached to the same carbon, the α–carbon. The various alpha amino acids differ in the side chain that is attached to their alpha carbon. This can vary in size from just a hydrogen atom in glycine, through a methyl group in alanine, to a large heterocyclic group in tryptophan.



Phenylalanine is one of the standard amino acids.

These alpha amino acids are the basic components of proteins. There are twenty standard amino acids used by cells in protein biosynthesis and these are specified by the general genetic code. These twenty amino acids can be biosynthesised from simpler molecules, but organisms differ in how many they are able to produce and essential amino acids must be obtained in their diet.

In proteins, an **amino acid residue** is what is left of an amino acid once a molecule of water has been lost (an H^+ from the nitrogenous side and an OH^- from the carboxylic side) in the formation of a peptide bond. These are the chemical bonds that links the amino acid monomers into a protein chain. Each different protein has a unique amino acid sequence that is known as its primary structure. Just as the letters of the alphabet can be combined in different ways to form an almost endless variety of words, amino acids can be linked together in varying sequences to form a huge variety of proteins. Each unique sequence of amino acids folds up to form a unique three-dimensional structure, the protein's tertiary structure. These tertiary structures determine the functions of proteins.

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